

A NEW SPECIES OF *CALOTIS* R. Br. (ASTERACEAE: ASTEREAEE) FROM
NEW SOUTH WALES.

by

P. S. SHORT*

ABSTRACT

Short, P. S. A new species of *Calotis* R. Br. (Asteraceae: Astereae) from New South Wales. *Muelleria* 7(3): 405–410 (1991). — *Calotis moorei* P. S. Short, is described and illustrated and notes on its distribution, possible breeding system, and relationships are provided.

TAXONOMY

Calotis moorei P. S. Short, *sp. nov.* affinis *C. cymbacanthae* F. Muell., sed aristis fructuum 4–8 differt, a *C. erinacea* Steetz, foliis caulibusque pilosis differt.

HOLOTYPE: 'Mt Mulyah' — about 80 km northwest of Louth. (Near homestead). 30°19'S, 144°32'E. Deep red brown sand. 26.ix.1984, *C. W. E. Moore* 8454 (CANB 354246). ISOTYPUS: (NSW, ex CANB 354245).

[*Calotis erinacea* auct. non Steetz; Davis, Proc. Linn. Soc. New South Wales 77: 164 (1952), as to *Officer s.n.* (NSW 14995).]

Perennial herb, 10–45 cm high, major axes ascending to erect, with septate hairs. *Leaves* alternate, mainly long-spathulate or oblanceolate to obovate but at least the upper ones lanceolate to ovate, 0.5–7 cm long, 0.2–1.4 cm wide, with 1–8 coarse teeth or lobes, or entire, with septate hairs. *Capitula* solitary, terminal, heterogamous, essentially radiate, but 4–5 of the innermost female 'ray' florets with 2–3 irregular corolla lobes and sometimes with one or more malformed anthers. *Involucre* c. 6–9 mm diam.; bracts, 12–14, in c. 2 rows, ovate, 2.6–3.9 mm long, 0.8–1.7 mm wide, outer surface with septate hairs, the margins with both septate, non-glandular and multicellular, glandular hairs, inner surface with septate glandular hairs, apex sometimes with a tuft of septate hairs. *Receptacle* very widely ovoid, with scale-like protrusions. *Ray florets* female, 26–33; corolla usually strap-like, 4.5–5.8 mm long, 1.2–1.6 mm wide, yellow; style arms lanceolate. *Disc florets* male, 19–25, corolla 1.8–3 mm long, lobes 4–5, yellow; stamens 4–5; anthers 1.3–1.6 mm long, microsporangium 1.1–1.2 mm long, terminal appendage 0.2–0.27 mm long; style arms not or barely divided. *Fruits* homomorphic, brown; body flattened, broadly cuneiform or widely obdeltoid, the exposed portion 1.3–2.2 mm long, 1.2–1.5 mm wide, tuberculate on each face, enclosed apically by the expanded bases of the awns; awns (3)4–8, equal in length or variable, c. 0.4–3.3 mm long, barbed along their whole length and hairy within the cup. (Figs 1, 2)

DISTRIBUTION:

Calotis moorei is apparently confined to New South Wales. Apart from the type locality, *i.e.* near the homestead of 'Mt Mulyah' sheep station, the only other collection known to me was gathered by E. Officer (NSW 14995) from the locality of 'Zara' (35°10'S, 144°35'E), about 480 km south of 'Mt Mulyah'.

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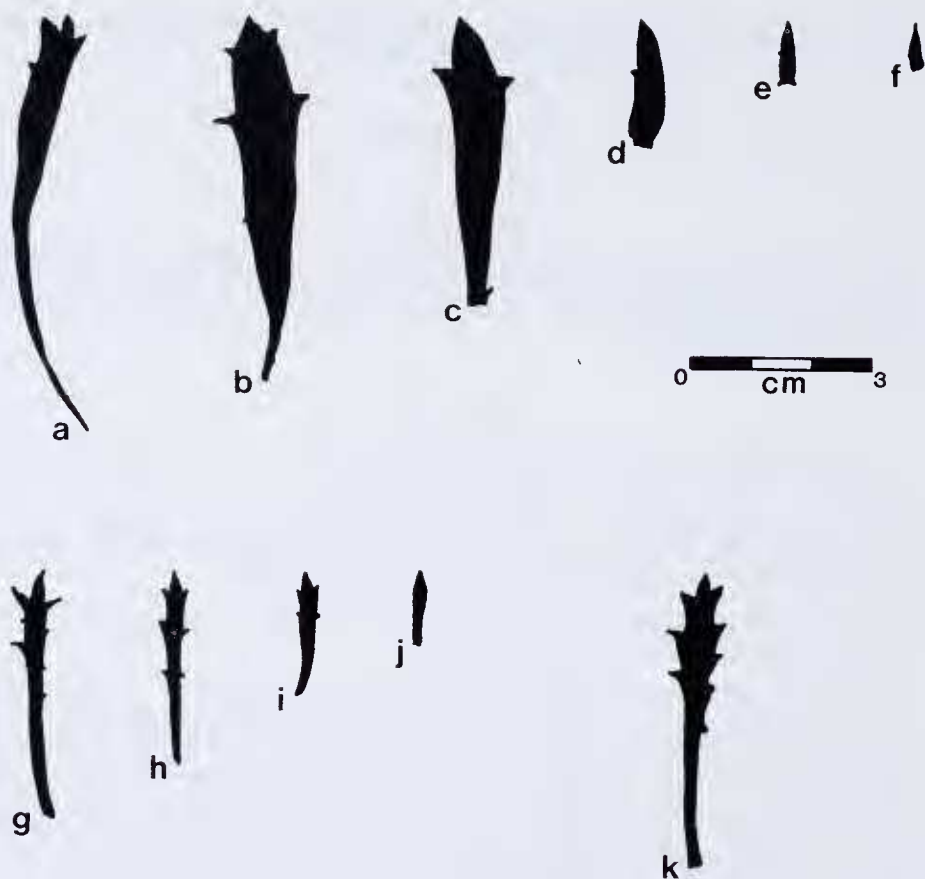


Fig. 1. Leaf variation in *C. moorei*. a-f — basal to upper leaves from the holotype specimen; g-j — basal to upper leaves in *Moore 5238*; k — mid-leaf from *Moore 5149*.

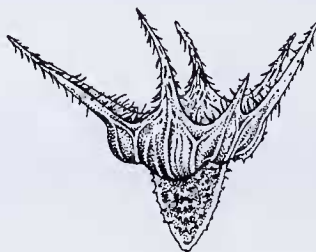


Fig. 2. Fruit of *C. moorei*, $\times 6$ (from holotype).

HABITAT & CONSERVATION STATUS:

Herbarium labels only record that *C. moorei* grows in 'red brown fine sand'. It has since been ascertained (C. W. E. Moore, *in litt.* 1990) that the population from which the type, and apparently other collections from 'Mt Mulyah' were gathered, grows on an extensive, relatively flat area, on the upper level of low sandhills. The original vegetation was probably *Acacia cambagei* woodland but no such trees remain. When the various collections were gathered scattered plants of *Dodonaea viscosa* subsp. *angustissima*, mostly in early stages of growth, were present. Mr Moore has also informed me that he doubts that he has seen plants that have survived for more than two years and that he has not seen any regeneration of *C. moorei* since 1984. He suggested that this may be because of the invasion of *Dodonaea*, which tend to prohibit growth of herbs. He further recorded that 'recently a portion of the area has been cleared using the blade plough, and perhaps there will be another population of *Calotis*, if the seed remains viable long enough'. These notes suggest that *C. moorei* is, very much, an endangered taxon.

ETYMOLOGY:

The specific epithet honours retired ecologist, Mr C. W. E. (Ted) Moore (1908–), who has worked extensively in western New South Wales, particularly around Bourke and Louth (J. G. West *in litt.* 1990). He gathered all but one of the collections of this species, arranged for their loan from CANB, and provided additional notes on the type locality.

NOTES:

Stace (1978), on the basis of number, size and configuration of chromosomes, recognised six species groups within *Calotis*. Her 'Group IV' contained five species, *i.e.* *C. cymbacantha* F. Muell., *C. erinacea* Steetz, *C. lappulacea* Benth., *C. latiuscula* F. Muell. & Tate, and *C. suffruticosa* Domin. A further species, *C. kempei* F. Muell., was not examined by Stace (1978) but various morphological features also suggest that it belongs to this group.

As well as cytological similarities all members of this group occur in arid and semiarid regions of Australia, and have yellow ray florets, a feature absent from other species of *Calotis*. All, with the possible exception of *C. cymbacantha*, are perennial herbs. *C. cymbacantha* is generally described as an annual.

Although it has not been examined cytologically *C. moorei* is clearly a member of this group. Morphologically its strongest affinities are with *C. cymbacantha* and forms of *C. erinacea*. Both species have been collected from 'Mt Mulyah' (C. W. E. Moore, *in litt.* 1990).

Calotis moorei is seemingly a perennial which flowers in the first year of growth and, at least at this stage, is vegetatively similar to *C. cymbacantha*. The leaves in both taxa are of similar size and shape and have an indumentum of septate hairs (Fig. 1). The fruit also share some features, *i.e.* a tuberculate body terminating in awns, but differ in awn number (Figs 2 & 3), the only definite feature by which the two taxa can be distinguished from each other. In *C. cymbacantha* the fruit usually have just two awns (Davis 1952, figs 58–60). Occasionally a few three-awned, as well as two awned fruit, may be found in the one capitulum. Three-awned fruit have been observed in *C. moorei* but the majority, including those within the same capitulum as three-awned fruit, have four or more prominent awns (Fig. 3).

In *C. cymbacantha* the awns are of equal length, except in the sporadically occurring three-awned fruit in which one awn may be considerably shorter than the other two. In *C. moorei* awns may be of similar length, particularly in four-awned fruit, or be extremely variable in length. For example, in seven or eight awned fruit several awns may be about 3 mm long but one or two may be little more than a short tooth about 0.4 mm long.

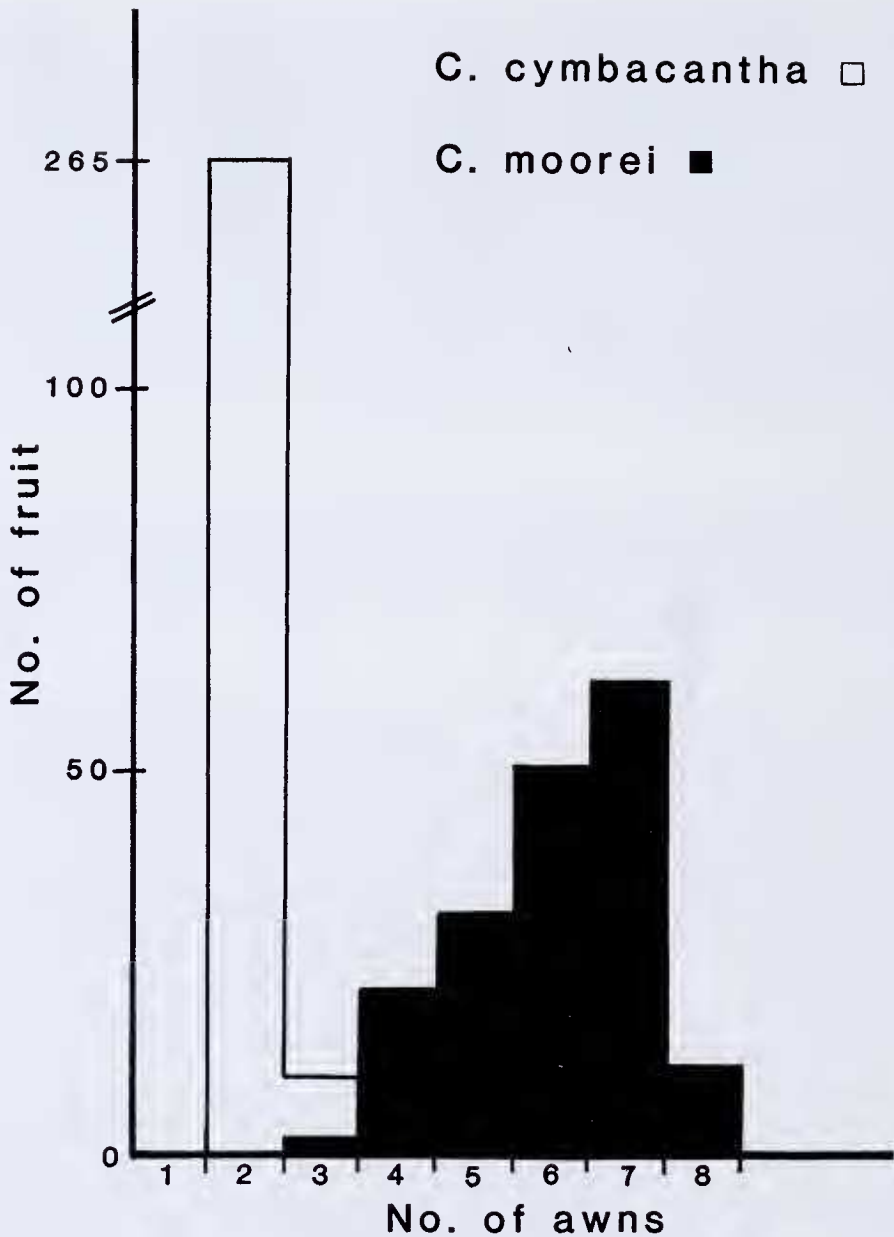


Fig. 3. The number of awns in fruit of *C. cymbacantha* and *C. moorei*.

Calotis moorei is not dissimilar vegetatively to some forms of *C. erinacea*, although in that species the branches and leaves are glabrous, not septate hairy. Both species may also have the same number of awns on the fruit, but in *C. erinacea* the body of the fruit is smooth, not tuberculate (Davis 1952, figs 43–47).

The conspicuous yellow ray florets indicate that this species commonly cross-pollinates and, as some florets may each produce several thousand pollen grains, there seems little doubt that cross-pollination can occur. However,

staining with phloxine/methyl green, suggests that the percentage of fertile pollen produced ranges from 0–80%. It has also been observed that a full complement of fruit are set within each capitulum.

High ploidy levels have been previously reported in 'Group IV' members of *Calotis*. *C. cymbacantha* has $n = 7$ & 14 , *C. erinacea* $n = 7$, 14 , 21 & 28 (Stace 1978). Stace's data suggests that, in the vicinity of 'Mt Mulyah', *C. cymbacantha* has $n = 14$ ($4n$) and *C. erinacea* $n = 28$ ($8n$).

C. lappulacea, a member of this group, is apparently an obligate apomict with somatic apospory (Davis 1968), as may be a further member, *C. suffruticosa* (Stace 1978).

Morphologically, *C. moorei* shares a number of attributes with *C. cymbacantha* and *C. erinacea*. This observation, together with those on pollen fertility and fruit set, plus the substantiated chromosome numbers and apomixis in related species, suggest that *C. moorei* may be of hybrid origin, is an apomict, and perhaps has $n = 21$ ($6n$).

I accept herein the specific status of *C. moorei* but do so with some reservations. Although the taxon is morphologically distinct, and no less distinct than many other species of *Calotis*, it may not be equatable with a stable, self-perpetuating taxon to which the rank of species is usually applied. Instead, it may be a hybrid apomict which is produced from time to time in disturbed habitats. Therefore, it is not difficult to argue that this taxon should not be formally given the rank of species. However, at least the hybrid derivation of this taxon is speculation, and the treatment of apomictic taxa is something that will always be controversial.

It also seems from MEL collections, and the account by Davis (1952), that the related species, *C. erinacea*, contains some distinctive entities which could be formally recognised. There is considerable variation in the number of awns on the fruit and differences may be geographically correlated. Ideally, these entities should have been more critically examined before the question of the rank of the taxon described here was decided upon. However, I am not in a position to carry out such a revision. Instead, my attention has been drawn to what is a rare taxon, one that could seemingly, and all too readily, join the ever increasing ranks of extinct taxa. I believe it of paramount importance to draw attention to such taxa by describing and formally naming them. The possibility that at a future date it may be decided that the name of the taxon should be *C. x moorei*, or that an infraspecific category should be adopted, is less important.

SPECIMENS EXAMINED:

With the exception of the isotype (NSW), and duplicates of *Moore 4986* (MEL 695833) and *Moore 5149* (MEL 695832), all specimens of *C. moorei* collected by C. W. E. Moore from 'Mt Mulyah', between 1967 and 1984, are housed at CANB, i.e. *Moore 4986*, *Moore 5149*, *Moore 5238* (4 sheets), *Moore 5498*, *Moore 5499*, *Moore 5918*, *Moore 6429*. The only other specimen of this species examined was *Officer s.n.* (NSW 14995) from 'Zara'.

Specimens of other species examined are housed at MEL.

ACKNOWLEDGEMENTS

I thank Mr Ted Moore for providing specimens and relevant data; Dr Judy West for providing some biographical notes on Mr Moore and for arranging the distribution of duplicate collections to MEL and NSW; Mr Neville Walsh for comments on the Latin; Dr Elizabeth Brown for arranging the loan of *Calotis* specimens from NSW, and for information on the locality of 'Zara'; and Anita Barley for providing the illustration of the fruit of *C. moorei*. He may not agree with my conclusions on the status of *C. moorei* but Dr Laurie Haegi made valuable comments on the manuscript.

REFERENCES

- Davis, G. L. (1952). Revision of the genus *Calotis* R. Br. *Proc. Linn. Soc. New South Wales* 77: 146-188.
- Davis, G. L. (1968). Apomixis and abnormal anther development in *Calotis lappulacea* Benth. (Compositae). *Aust. J. Bot.* 16: 1-17.
- Stace, H. M. (1978). Cytoevolution in the genus *Calotis* R. Br. (Compositae: Astereae). *Aust. J. Bot.* 26: 287-307.

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